

Patent Claims

1. A method for attaching foil sheetings (15) to surfaces of structures, in particular to tunnel walls, in which at least one supply of foil sheeting, in particular a roll of foil (5), moves along the surface (3) to be covered by means of an installation movement and thus the foil sheeting (15) is pulled from the supply or off the roll and is applied to the surface, wherein the foil sheeting (15) is attached to the surface (3) by a hot-melt-type adhesive prepared by a melting device (7, 8), is hereby characterized in that the melting device (7, 8) is guided together with the supply of foil or the roll of foil in the installation movement.

2. The method according to claim 1, further characterized in that the melting device (7, 8) prepares foamed hot-melt-type adhesive, whereby, in particular, the gas supply (8) for the foaming is also guided along in the installation movement.

3. The method according to claim 1 or 2, further characterized in that the melting device (7, 8) is disposed on a platform (10) remaining essentially horizontal during the installation movement.

4. The method according to claim 3, further characterized in that the platform (10) is configured as a work staging accessible to personnel.

5. The method according to one of claims 1 to 4, further characterized in that the hot-melt-type adhesive is introduced onto the foil sheeting by individual application heads (17) fed separately from the melting device.

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6. A method for attaching foil sheetings (15) to surfaces of structures, in particular to tunnel walls, in which at least one supply of foil sheeting, in particular a roll of foil (5), moves along the surface (3) to be covered by means of an installation movement and thus the foil sheeting (15) is pulled from the supply or off the roll and is applied to the surface, wherein the foil sheeting (15) is attached to the surface (3) by attachment means, in particular by a hot-melt-type adhesive prepared by a melting device (7, 8), in particular according to one of claims 1 to 5, is hereby characterized in that the installation movement is produced by means of a displacing device (4), which bears the supply of foil, in particular the roll of foil, on one end, and which at the other end, can be moved, especially can be moved horizontally, for executing the installation movement, and is also disposed so that it can pivot on a supporting structure (6), in particular, a gantry crane.

7. The method according to claim 6, further characterized in that the displacing device is adjustable in length and in particular has a length-adjustable arm (12) and, in particular, has a telescopic length-adjustable arm, wherein the pivot axis (11) of the arm can be arranged so that it can move on the supporting structure.

8. The method according to claim 6 or 7, further characterized in that the lengthwise axis (26) of the roll of foil (5) in the horizontal plane determined by this lengthwise axis can be pivoted out from a position in which the lengthwise axis (26) is parallel to the line of intersection of the horizontal plane with the surface of the structure,

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driven into positions in which the lengthwise axis is not parallel to this line of intersection.

9. The method according to one of claims 6 to 8, further characterized in that the lengthwise axis (26) of the roll of foil (5) can be pivoted back and forth, driven out from the horizontal plane determined by this lengthwise axis, in particular, so that the lengthwise axis maintains one point in the plane.

10. The method according to claim 8 or 9, further characterized in that the pivoting movement of the lengthwise axis (26) of the roll of foil (5) is executed by a corresponding movement of the displacing device (4) on supporting structure (6).

11. The method according to claims 7, 8 and 10, further characterized in that the pivoting movement of the lengthwise axis (26) of the roll of foil (5) is executed by making the pivot axis (11) of the arm (12) rotatable around an axis of rotation (48) that is perpendicular to the horizontal plane B.

12. The method according to claims 7, 9, and 10, further characterized in that the pivoting movement of the lengthwise axis (26) of the roll of foil (5) out from the horizontal plane B is executed by tilting the pivot axis (11) of the arm (12) around a horizontal tilting axis (38).

13. A device (1) for attaching foil sheetings (15) to surfaces of structures (3), in particular to tunnel walls, comprising a supporting structure (6), a displacing device disposed thereon, configured for the uptake of at least one supply of foil sheeting, in particular, a roll of foil (5), which is configured for executing an installation movement,

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in which a foil sheeting can be pulled from the supply or off the roll (5) and can be applied to the surface of the structure, as well as a melting device (7, 8) for preparing a molten adhesive from a solid hot-melt-type adhesive material, is hereby characterized in that the melting device (7, 8) is joined with the displacing device (4) or a part of the same, so that it takes part in the installation movement.

14. A device (1) for attaching foil sheetings (15) to surfaces of structures (3), in particular to tunnel walls, comprising a supporting structure (6), a displacing device disposed thereon, configured for the uptake of at least one supply of foil sheeting, in particular, a roll of foil (5), which is configured for executing an installation movement, in which a foil sheeting can be pulled from the supply or off the roll (5) and can be applied to the surface of the structure, in particular, according to claim 13, is hereby characterized in that the displacing device (4) is disposed so that it can move, in particular that it can move horizontally in parallel and also can pivot on supporting structure (6), for executing the installation movement.

15. The device according to claim 13 or 14, further characterized by a platform (10) that is joined with the displacing device, on which the melting device is disposed.

16. The device according to claim 15, further characterized in that the platform (10) is disposed so that it remains essentially horizontal during the installation movement.

17. The device according to claim 16, further characterized in that the platform is configured as a work staging.

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18. The device according to one of claims 13 to 17, further characterized in that the displacing device (4) has at least one arm (12), which can be pivoted around an axis (11) on supporting structure (6), which runs essentially parallel to the lengthwise axis (26) of the uptake for the roll of foil.

19. The device according to claim 18, further characterized in that the axis (11) is disposed on supporting structure (6) so that it can be adjusted in its inclination relative to the horizontal plane.

20. The device according to one of claims 18 or 19, further characterized in that the axis (11) can be rotated around another axis (48) that is essentially perpendicular to the horizontal plane.

21. The device according to one of claims 11 to 14, further characterized in that it is a length-adjustable arm and, in particular, a telescopic arm.

22. The device according to one of claims 13 to 21, further characterized in that the arm has a device for pretreating the tunnel walls (3) that can be moved together with the supply of foil sheeting, this device being disposed in front of the supply of foil sheeting in the direction of travel of the movable supporting structure (6) and, in particular, has wire brushes (45, 46) and/or milling cutters, which are particularly disposed at the same distance from as are the application heads disposed on the melting device.

23. The device according to claim 22, further characterized in that the pretreatment device can also be moved by the displacing device (4).

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24. The device according to one of claims 13 to 23, further characterized in that the device comprises a welding device (49), which can be moved, in particular, by means of another, preferably horizontal, movable and also pivotable displacing device, in particular, an arm (34, 61).

25. The device according to claim 24, further characterized in that the movement of the other displacing device (34, 61) is independent from the installation movement of the first displacing device (12, 35), apart from the pivoting movement of the lengthwise axis (26) for the uptake of the roll of foil in the horizontal plane by this and the inclining movement of the lengthwise axis (26), which are also conducted by the second displacing device (34, 61).

26. Use of foamed hot-melt-type adhesive for attaching foil sheetings to tunnel arches, in particular to pneumatically-applied concrete arches.

27. The use according to claim 26, further characterized in that the adhesive surfaces for the hot-melt-type adhesive are pretreated by wire brushes and/or milling cutters.